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**Stockholm Convention on Persistent Organic Pollutants  
Persistent Organic Pollutants Review Committee  
Third meeting  
Geneva, 19–23 November 2007**

## **Report of the Persistent Organic Pollutants Review Committee on the work of its third meeting**

### **Addendum**

#### **Risk management evaluation on chlordecone**

At its third meeting, the Persistent Organic Pollutants Review Committee adopted the risk management evaluation on chlordecone, on the basis of the draft contained in document UNEP/POPS/POPRC.3/10 and the revision to the risk profile contained in document UNEP/POPS/POPRC.3/20/Add.10. The text of the risk management evaluation, as amended, is set out below. It has not been formally edited.

# **CHLORDECONE**

## **RISK MANAGEMENT EVALUATION**

Adopted by the Persistent Organic Pollutants Review Committee  
at its third meeting

**November 2007**

## TABLE OF CONTENTS

Executive summary	.....	4
1.	Introduction	5
1.1.	Chemical identity, production and uses	5
1.1.1.	Chemical Identity	5
1.1.2.	Production and uses	5
1.2.	Conclusions of the Review Committee regarding Annex D and Annex E information	6
1.3.	Data sources	6
1.4.	Status of the chemical under international conventions	7
1.5.	Any national or regional control actions taken	7
1.5.1.	Regulation at European level	7
1.5.2.	Regulation at national level	7
2.	Identification of possible control measures	8
2.1.	Alternatives	8
2.1.1.	Description of alternatives	8
2.1.2.	Technical feasibility	9
2.1.3.	Costs, including environmental and health costs	9
2.1.4.	Efficacy	9
2.1.5.	Availability	9
2.1.6.	Accessibility	9
2.2.	Efficacy and efficiency of possible control measures in meeting risk reduction goals	9
2.2.1.	Technical feasibility	9
2.2.2.	Costs, including environmental and health costs	10
2.3.	Summary of information on impacts on society of implementing possible control measures	10
2.3.1.	Health, including public, environmental and occupational health	10
2.3.2.	Agriculture, including aquaculture and forestry	10
2.3.3.	Biota (biodiversity)	10
2.3.4.	Economic aspects	10
2.3.5.	Movement towards sustainable development	10
2.3.6.	Social costs	11
2.3.7.	Other impacts (waste and disposal implications - technical feasibility)	11
2.4.	Other considerations	11
2.4.1.	Access to information and public education	11
2.4.2.	Status of control and monitoring capacity	12
3.	Synthesis of information	12
4.	Concluding statement	13
References	.....	14

## Executive summary

The European Community and its Member States being Parties to the Stockholm Convention proposed Chlordecone to be listed in Annex A to the Convention in 2005. At its 2nd meeting in 2006, the POP Review Committee considered that although the information on long-range environmental transport is not fully conclusive, there is evidence suggesting the relevance of some transport pathways. The Committee concluded, in accordance with paragraph 7 (a) of Article 8 of the Convention, and taking into account that a lack of full scientific certainty should not prevent a proposal from proceeding, that Chlordecone is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and environmental effects such that global action is warranted.

Chlordecone is an intentionally produced chemical that has been used as a pesticide. According to the available information, the main production and use of Chlordecone and related formulations had in effect ceased by the end of the eighties. It cannot, however, be excluded that Chlordecone may still be produced or used as an agricultural pesticide in some developing countries, although there are no reports of such production or use.

The most efficient control measure would be the prohibition of all production and uses of Chlordecone and Chlordecone containing products. As no remaining production or uses of Chlordecone have been identified, listing of Chlordecone in Annex A without any specific exemptions would be the primary control measure under the Convention. Listing of Chlordecone in Annex A would also mean that the provisions of Article 3 on export and import and of Article 6 on identification and sound disposal of stockpiles and waste would apply.

As the production of Chlordecone has ceased some decades ago in the main producing countries, there are now alternatives available with comparative efficacy, and without cost implications. Based on this background, significant negative impact on society is not expected if Chlordecone is listed in Annex A of the Convention. No requests have been received nor particular needs identified for specific exemptions on Chlordecone..

A beneficial effect could be expected as any currently unidentified production and use around the world should end. In addition, management and disposal of all remaining stocks would be improved and accelerated. Finally, the possibility of re-introduction of Chlordecone in certain countries leading to increased releases and levels in the environment would be prevented on a global scale.

However, to completely and effectively terminate releases of Chlordecone into the environment, the issue of environmental degradation of related substances or derivatives (such as Kelevan) into Chlordecone would have to be taken into consideration.

The Committee prepared this risk management evaluation and concluded that although Chlordecone is not known to be currently produced or used, it is important to prevent its re-introduction into commerce and use.

Therefore, in accordance with paragraph 9 of Article 8 of the Convention, the Committee recommends the Conference of the Parties to the Stockholm Convention to consider listing of Chlordecone in Annex A. As no remaining production or uses of Chlordecone have been identified, listing of Chlordecone in Annex A without any specific exemptions is feasible. Furthermore, the Committee recommends focusing the implementation efforts in identifying and managing obsolete stockpiles and wastes containing Chlordecone and setting the proper measures for preventing future production and use of Chlordecone.

## 1. Introduction

The European Community and its Member States being Parties to the Stockholm Convention have proposed Chlordecone to be listed in Annex A to the Convention (UNEP/POPS/POPRC.1/6).

### 1.1. Chemical identity, production and uses

Chlordecone is a synthetic chlorinated organic compound, which has mainly been used as an agricultural insecticide, miticide and fungicide.

#### 1.1.1. Chemical Identity

Names and registry numbers:

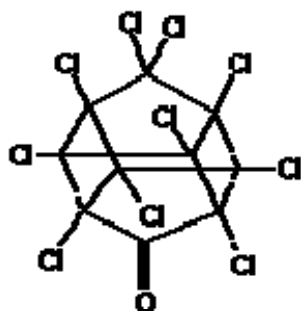
*CAS chemical name:* 1,1a,3,3a,4,5,5,5a,5b,6-decachloro-octahydro-1,3,4-metheno-2H-cyclobuta-[cd]-pentalen-2-one

*Synonyms:* decachloropentacyclo (5.2.1.0'2,6.0'3,9.0'5,8) decan-4-one  
Decachlorooctahydro-1,3,4-metheno-2H,5H-cyclobuta-[cd]-pentalen-2-one,  
Decachloroketone

*Trade names:* GC 1189, Kepone, Merex, ENT 16391, Curlone

*CAS registry number:* 143-50-0

Structure:



Source: <http://webbook.nist.gov>, as quoted in <http://ecb.jrc.it>

#### 1.1.2. Production and uses

Based on the available information, Chlordecone is no longer produced or used. According to its Risk Profile, Chlordecone has been used in various parts of the world for the control of a wide range of pests. In particular, Chlordecone has been used extensively in the tropics for the control of banana root borer. It has been used as a fly larvicide, as a fungicide against apple scab and powdery mildew, to control the Colorado potato beetle, the rust mite on non-bearing citrus, and the potato and tobacco wireworm on gladioli and other plants. Chlordecone has also been used in household products such as ant and roach traps.

According to the Risk Profile on Chlordecone, the chemical was first produced in 1951 and introduced commercially in the United States in 1958. Chlordecone was produced and used in the USA until 1976. Chlordecone was also found to be present in technical grade Mirex. Between 1951 and 1975, approximately 1.6 million kg of Chlordecone were produced in the United States. Diluted technical grade Chlordecone (80% active ingredient) was exported from the USA to Europe and particularly to Germany in large quantities from 1951 to 1975 where it was converted to Kelevan which is a derivative of Chlordecone that is used for the same purposes. In the environment, Kelevan oxidizes to Chlordecone and could therefore also be considered with Chlordecone for listing in the Stockholm Convention. Approximately 90-99% of the total volume of Chlordecone produced during this period was exported to Europe, Asia, Latin America, and Africa. There is no information, indicating that Kelevan is currently being produced or used.

Formulated Chlordecone was marketed in France with the name Curlone, by De Laguarique from 1981 to 1993. Chlordecone for this formulation was synthesised in Brazil. The formulation was used in Martinique and Guadeloupe following the passage of hurricanes Allen in 1979 and David in 1980 which led to considerable pest infestations. The authorisation for the production and use of Curlone was withdrawn by the French Ministry of Agriculture in 1990. Use

was continued until September, 1993 (Beaugendre, 2005). In Canada, no product containing Chlordecone has been registered as a pest control product since 2000.

### 1.2. Conclusions of the Review Committee regarding Annex D and Annex E information

The Committee has conducted and evaluated the risk profile in accordance with Annex E at its second meeting in Geneva 6-10 November 2006. The Committee considered that although the information on long-range environmental transport is not fully conclusive, there is evidence suggesting the relevance of some transport pathways. The Committee concluded, in accordance with paragraph 7 (a) of Article 8 of the Convention, and taking into account that a lack of full scientific certainty should not prevent a proposal from proceeding (decision POPRC-2/2), that Chlordecone is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and environmental effects such that global action is warranted.

Furthermore, the Committee invited the drafting group on Chlordecone which prepared the risk profile to explore any further information on long-range environmental transport and risk estimations and, if appropriate, to revise the risk profile for consideration by the Committee at its third meeting.

The Committee decided furthermore, in accordance with paragraph 7 (a) of Article 8 of the Convention and paragraph 29 of decision SC-1/7 of the Conference of the Parties to the Stockholm Convention, to establish a drafting group to prepare a risk management evaluation that includes an analysis of possible control measures for Chlordecone in accordance with Annex F to the Convention and invited, in accordance with paragraph 7 (a) of Article 8 of the Convention, Parties and observers to submit to the Secretariat the information specified in Annex F for Chlordecone.

### 1.3. Data sources

The draft Risk Management Evaluation is primarily based on information that has been provided by Parties to the Convention and observers. Parties and observers that provided responses regarding the information specified in Annex F of the Stockholm Convention (risk management) are listed in Table 1-1.

**Table 1-1. Annex F questionnaires delivered by April 2007**

<b>Party</b>	<b>Institution</b>	<b>Date of submission</b>
<b>Algeria</b>	Permanent Mission at the UNO and international organisations in Switzerland	<b>12. 01. 2007</b>
<b>Canada</b>	Environment Canada	<b>08.02.2007</b>
<b>Czech Republic</b>	Ministry of Environment	<b>06.02.2007</b>
<b>Germany</b>	Federal Environmental Agency	<b>07.02.2007</b>
<b>Japan</b>	Global Environmental Division, Ministry of Foreign Affairs	<b>09.02.2007</b>
<b>Mauritius</b>	Government	<b>29. 01. 2007</b>
<b>Monaco</b>	Government, Department of Environment	<b>Not available</b>
<b>Switzerland</b>	Federal Office for the Environment	<b>06.02.2007</b>
<b>Thailand</b>	Ministry of Public Health, Hazardous Substances Control Group	<b>16.02.2005</b>
<b>Zambia</b>	Environmental Council from Government of Zambia	<b>31.01.2007</b>
<b>Country observer</b>	United States Environmental Protection Agency, Office of Pesticide Programs	<b>09.02.2007</b>
<b>Industry Observer</b>	CropLife International	<b>09.02.2007</b>

In addition, France provided a report prepared for the Assemblée Nationale describing the history of production and use of Chlordecone in Martinique and Guadeloupe (Beaugendre, 2005) and a report on organochlorine pollution in the same region (Cabidoche et al., 2006).

Specific national and international risk management reports for Chlordecone have not been identified.

#### 1.4. Status of the chemical under international conventions

Chlordecone is listed in Annex I of the Protocol to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) on Persistent Organic Pollutants. The provisions of the Protocol oblige Parties to phase out all production and uses of Chlordecone. Chlordecone is also included in the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) as a substance of possible concern<sup>1</sup>. Under the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM Convention<sup>2</sup>) Chlordecone is listed as selected substances for immediate priority action (Recommendation 19/5, Attachment, Appendix 3) and is scheduled for elimination (Annex I, part 2). HELCOM aims to move towards the target of the cessation of discharges, emissions and losses of hazardous substances by the year 2020.

In Annex VIII of the Basel Convention, off-specification or out-dated pesticides, without specific mention of Chlordecone, are classified as hazardous.

Chlordecone is currently not listed in the Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade. Thailand has submitted a notification for Chlordecone of Final Regulatory Action for Banned or Severely Restricted Chemicals that has been verified to meet the requirements of Annex I of the Rotterdam Convention.

#### 1.5. Any national or regional control actions taken

##### 1.5.1. Regulation at European level

In the European Union, Chlordecone is listed in Annex I to Regulation (EC) No 850/2004 on persistent organic pollutants as scheduled for elimination and with complete prohibition of production and use.

The issue of Chlordecone in waste is addressed at European level in Regulation 850/2004/EC, as amended by Regulation 1195/2006/EC. According to this act, waste containing the listed POPs (including Chlordecone) above the concentration limit of 50 mg/kg has to be treated in such a manner that the POP content is destroyed.

##### 1.5.2. Regulation at national level

At the national level, legal control actions taken have been reported by Germany, Canada, the USA, Switzerland, Thailand and Japan.

In Canada, production, sale, and use of Chlordecone are currently prohibited for all pesticide uses under the Pest Control Products Act (PCPA). Any stocks that existed at the time that pesticide registration was discontinued or suspended were to be sold, used or disposed of in accordance with an established timetable, after which their sale or use became a violation of the PCPA.

Therefore, there is no commercial reason to maintain stockpiles. In addition, Canada has established post-registration monitoring and compliance programs to ensure compliance with federal and provincial legislation. Although there is no Convention obligation to do so, federal, provincial and territorial hazardous waste programs address small quantities of retired material in the possession of consumers and have collected and safely disposed of pesticide products that are no longer registered. No further control measures are required.

In the USA, all uses of Chlordecone under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act have been cancelled by the USEPA in 1977. Under the Resource Conservation and Recovery Act (RCRA), chlordecone is listed as a hazardous waste when it is a discarded commercial chemical product off-specification species, container residue, and spill residue thereof (EPA 1980b quoted from US ATSDR 1995). US ATSDR 1995 contains an overview of further regulations and Guidelines applicable to Chlordecone in the USA. There is no record of any Chlordecone or Chlordecone-containing products registered to the U.S. FDA.

In Switzerland, Chlordecone has been prohibited since 1986. In Mauritius, Chlordecone is listed as a prohibited agricultural chemical in the Dangerous Chemicals Control Act (DCCA). The law prohibits importation, manufacture, use or possession of Chlordecone.

In Japan, Chlordecone is included in a list of 300 substances (or group of substances) selected by the Ministry of the Environment for further investigation (environmental levels, combined effects) into the “environmental risk”.

<sup>1</sup> The chemically related compound Mirex is already included in the Stockholm convention. Both Mirex and Chlordecone are included in the UNECE 1998 Aarhus Protocol on Persistent Organic Pollutants (POPs). Both are included in OSPAR as substances of possible concern.

<sup>2</sup> [http://www.helcom.fi/environment2/hazsubs/action/en\\_GB/list/?u4.highlight=Chlordecone](http://www.helcom.fi/environment2/hazsubs/action/en_GB/list/?u4.highlight=Chlordecone)

In Thailand, production, importation, exportation or possession of Chlordecone for use in households and public health programmes is prohibited based on the Hazardous Substances Control Act B.E. 2535 (1992).

Zambia has reported that there is no documented evidence of action taken at its national level.

## 1. Identification of possible control measures

Legal prohibition of production and use of Chlordecone or Chlordecone-containing products have been stated as major control measures by all responding Parties (Annex F responses 2007).

In addition, Canada states the elimination of stocks and their environmental sound disposal as an additional type of control measure taken (see section 1.5.2).

Mauritius stressed the issue of import control to prevent uses in countries which did not produce Chlordecone.

Besides these control measures no further action has been reported or has been deemed necessary by contracting Parties or observers.

As Chlordecone is an intentionally produced pesticide, the most evident and efficient control measure would be the prohibition of all production and uses of Chlordecone and Chlordecone-containing products. Alternatively, in accordance with Article 3(1), legal and administrative measures (*e.g.* withdrawal or denial of pre-production and pre-marketing authorisation of pesticide products) necessary to eliminate Chlordecone would have the same impact. As no remaining uses of Chlordecone have been identified, listing of Chlordecone in Annex A without any specific exemptions could be the primary control measure under the Convention.

Listing of Chlordecone in Annex A would also mean that the provisions of Article 3 on export and import and of Article 6 on identification and sound disposal of stockpiles and waste would apply.

### 2.1. Alternatives

Information on alternative pesticides has been reported from Canada and USA. France has provided information related to the use of Chlordecone in Guadeloupe and Martinique. It should be noted that the chemical alternatives mentioned below are not concluded as safe or recommended by the POP Review Committee.

#### 2.1.1. Description of alternatives

According to Environment Canada, several alternatives to the pesticide uses of Chlordecone are currently registered and in use in Canada. However, the table referred to was not provided (Annex F responses, Canada 2007).

In the USA, the following alternatives are registered for use to control specific pests (NPIRS, 2007, referenced in the Annex F responses, USA, 2007):

- Banana root borer: ethoprop, oxamyl.
- Tobacco wireworms: cyfluthrin, imidacloprid.
- Ants and/or cockroaches: azadirachtin, bifenthrin, boric acid, carbaryl, capsaicin, cypermethrin, cyfluthrin, deltamethrin, diazinon, dichlorvos, esfenvalerate, imidacloprid, lambda-cyhalothrin, malathion, permethrin, piperonyl butoxide, pyrethrins, pyriproxyfen, resmethrin, s-bioallethrin, tetramethrin.

An assessment of these alternatives has not been provided by the USEPA.

According to a French study on the use of Chlordecone in the French Antilles (Beaugrande *et al.*, 2005), the farmers used the following substances as substitutes after the use of Chlordecone had been stopped:

- Aldicarb
- Isophenphos
- Phenamiphos
- Cadusaphos
- Terbuphos

The authors concluded that exemptions for the use of Chlordecone were no longer justified as appropriate substitutes for Chlordecone were available. According to another French study on organochlorine pollution in the French Antilles (Cabidoche *et al.*, 2006), pesticides used as Chlordecone alternatives in Guadeloupe and Martinique (such as cadusaphos) are biodegradable within several weeks.



Contracting Parties which reported no historical production or use did not report on alternatives.

Alternative pesticide products have been reviewed by the Canadian Pest Management Regulatory Agency (PMRA) and the environmental and health risks associated with their pesticide uses have been considered acceptable (Annex F responses, Canada 2007).

Alternatives to chlordecone also include non-chemical agro-ecological methods such as preventative pest management through appropriate fertility and field sanitation practices that reduce pest pressure; the use and habitat enhancement of natural enemies; microbial preparations such as *Bacillus thuringiensis*; cultural practices such as crop rotation, intercropping, and trap cropping; barrier methods, such as screens, and bagging of fruit; use of traps such as pheromone and light traps to attract and kill insects. These and other agro-ecological methods are being extensively and successfully practised in many countries, eliminating the need for Chlordecone or other chemical interventions.

Algeria compiled principal measures to control the impact of pesticides without specifically addressing Chlordecone as a pesticide. Measures included preventive techniques (e.g. soil aeration), mechanical control techniques (e.g. raking), burning of weeds, use of antagonistic macro-organisms (insects, parasites, predator insects), use of bio-insecticides and pesticides, and the use of composed measures such as application of precautionary principle, permitting, information and education, research and development, and environmentally sound waste management to protect environment and human health.

CropLife, the international association for the pesticides industry, did not provide any information but stated that a comparative evaluation of the risk of the alternatives to Chlordecone is meaningless as a risk evaluation was never performed for Chlordecone itself (Annex F responses, CropLife, 2007).

### **2.1.2. Technical feasibility**

Alternative pesticide products are currently being utilized in Canada and the USA. Technical feasibility is a requirement for registration by Canada's PMRA. (Annex F responses, 2007). Non-chemical agro-ecological methods are currently being used in many countries as alternatives to chemical insecticides, including Chlordecone.

### **2.1.3. Costs, including environmental and health costs**

Information on costs of alternatives has not been provided by Parties. In Canada however, PMRA reviewed environmental and health risks from alternatives in use and considered them acceptable (Annex F responses, Canada 2007). Correspondingly, at least a slight benefit for both the environment and health could be expected. According to IPEN, there are important general points to consider when evaluating the costs of alternatives for any product (Ackerman et al., 2006) as specified in:

- Alternatives with a higher initial purchase cost may actually be more cost effective over the life of the product when durability and other factors are taken into account;
- Mass-production of alternatives can significantly lower their costs

### **2.1.4. Efficacy**

Alternative pesticide products have been reviewed by the PMRA and have been determined to be efficacious for each registered pesticide use (Annex F responses, Canada 2007).

### **2.1.5. Availability**

The alternative pesticide products listed in chapter 2.1.1. were readily available in the USA. In Canada, availability of all the registered alternatives listed in 2.1.1. was reported to be market dependent. (Annex F responses, 2007). Non-chemical agro-ecological alternatives are widely available throughout many countries.

### **2.1.6. Accessibility**

The alternatives listed in chapter 2.1.1 are accessible in the USA and was reported in Canada to be market dependent. (Annex F responses, 2007)

## **2.2. Efficacy and efficiency of possible control measures in meeting risk reduction goals**

### **2.2.1. Technical feasibility**

In all Parties responding to the questionnaire, production, sale, and use of Chlordecone is prohibited. This essential phase-out of production and use of Chlordecone indicates that technically feasible alternatives have already been

implemented. Also, as done in the USA in 1977, it was deemed technically feasible to cancel the registration of all uses. (Annex F responses, 2007)

### **2.2.2. Costs, including environmental and health costs**

The phase-out of Chlordecone that has already occurred indicates that costs of alternatives have not inhibited their substitution. For the USA, there would be no additional costs to prohibit the use of Chlordecone, as USEPA cancelled these uses in 1977. In Canada, disposal of de-registered pesticides has already taken place (see 2.2.1). No specific comments have been provided by other Parties. (Annex F responses, 2007)

Costs could arise from elimination of unknown production and potential disposal of remaining stocks. In the case of Chlordecone, costs, however, are not expected to be important even though no information has been provided. Benefits to health and environment are expected from decreasing environmental levels when a ban of Chlordecone production and use is established at a global scale.

## **2.3. Summary of information on impacts on society of implementing possible control measures**

### **2.3.1. Health, including public, environmental and occupational health**

No discernible negative impacts on society have been reported from prohibition or phase-out of Chlordecone as it is apparently not currently in production or use. A listing in Annex A would prevent future production and integration into products. This would therefore prevent negative impacts on public, environmental and occupational health that would accrue from any future production or use of Chlordecone.

As production, sale and use of Chlordecone as a pesticide are prohibited in Canada, negative human health effects due to an ongoing pesticide use of Chlordecone are eliminated.

As Chlordecone has not been and is not used, no impacts in the context of pesticide use are expected from a regulation of Chlordecone under the Stockholm Convention for Germany. On a global level, a positive impact on human health can be expected from a ban of Chlordecone from the German point of view. (Annex F responses, Germany 2007)

### **2.3.2. Agriculture, including aquaculture and forestry**

No discernible negative impacts on agriculture have been reported from prohibition or phase-out of Chlordecone due to the existence of viable alternatives.

There are no negative impacts on this sector in Canada as viable alternative pesticide products are available. A corresponding situation can be expected for the USA and other countries although no specific comment has been provided on this topic. No impacts in the context of pesticide-use are expected from a regulation of Chlordecone under the Stockholm Convention in countries which never used this pesticide. (Annex F responses, 2007)

### **2.3.3. Biota (biodiversity)**

As production, sale and use of Chlordecone as a pesticide are prohibited in Canada, negative effects on biota due to an ongoing pesticide use of Chlordecone are eliminated.

As Chlordecone has not been and is not used, no impacts in the context of pesticide use are expected from a regulation of Chlordecone under the Stockholm Convention for Germany. On a global level, a positive impact on biota can be expected from a ban of Chlordecone from the German point of view. (Annex F responses, Germany 2007).

### **2.3.4. Economic aspects**

No negative economic impacts to Canada are apparent through the current prohibition of Chlordecone as a pesticide. As Germany does not use Chlordecone, no impacts in the context of pesticide use are expected from a regulation of Chlordecone under the Stockholm Convention. Information for other countries is not available; however cost-competitive alternatives that do not exhibit POPs characteristics have already been implemented for all uses of Chlordecone. Therefore, no negative economic impacts from a global ban on Chlordecone are expected.

### **2.3.5. Movement towards sustainable development**

The prohibition of Chlordecone contributes positively to sustainable development in that protection of crops through previous Chlordecone pesticide uses is still maintained by alternative methods and the risk to the environment and human health is less.

As the persistent, bioaccumulative and toxic properties of Chlordecone as well as its potential for a long-range transboundary transport were judged to be shown under the UNECE Protocol and by the POP Review Committee of the

Stockholm Convention which concluded that Chlordecone meets the screening criteria listed in Annex D, a positive impact on a globally sustainable development from a ban/restriction of the substance is to be expected.

Reduction and elimination of Chlordecone is consistent with sustainable development plans that seek to reduce emissions of toxic chemicals. A relevant global plan is the Strategic Approach to International Chemicals Management (SAICM) that emerged from the World Summit on Sustainable Development<sup>3</sup>. The Overarching Policy Strategy calls to promote and support the development and implementation of, and further innovation in, environmentally sound and safer alternatives, including cleaner production, informed substitution of chemicals of particular concern and non-chemical alternatives. Moreover the Global Plan of Action of SAICM, listing the proposed work areas and activities contains specific measures to support risk reduction that include prioritizing safe and effective alternatives for persistent, bioaccumulative, and toxic substances.

### 2.3.6. Social costs

According to Canada, no negative social costs are apparent through the current prohibition of Chlordecone used as a pesticide. Since Chlordecone has already been replaced with other substances or technologies, the impact of an Annex A listing on consumers and farmers should be negligible and not incur any social costs

### 2.3.7. Other impacts (waste and disposal implications - technical feasibility)

Technical feasibility of the disposal of waste Chlordecone is no longer applicable in Canada, as any stocks that existed at the time that pesticide registration was discontinued or suspended were to be sold, used or disposed of in accordance with an established timetable. Canada has established post-registration monitoring and compliance programmes to ensure compliance with federal and provincial legislation and federal, provincial and territorial hazardous waste programmes address and have collected and safely disposed of small quantities of retired pesticide products in the possession of consumers.

As the pesticide was not applied in Germany, no obsolete stocks of Chlordecone are expected to be found. However, the introduction of a threshold for Chlordecone in waste (Regulation 1195/2006/EC4) will lead to measures taken in Germany as well. At the moment no information on costs is available.

Further Regulations concerning the annexes of Regulation (EC) 850/2004 are expected to be elaborated for the European Union. These are related to thresholds and regulations of destruction measurements.

Finally, no data on existing Chlordecone stockpiles have been provided but it can be assumed that some countries may still possess obsolete stockpiles which would need to be managed as waste in accordance with Article 6 of the Convention if listed in Annex A or B. At least two regions (Sub-Saharan Africa and South East Asia / South Pacific) have identified Chlordecone as a possible substance of concern in their Regionally Based Assessment of Persistent Toxic Substances but no further information on possible obsolete stockpiles is provided in those reports. (UNEP 2002a, UNEP 2002b)

In a report submitted by France, the issue of soil decontamination by Chlordecone has been addressed. According to the report, common techniques of soil decontamination such as solvent extraction and incineration are cost intensive. Microbiological degradation is not promising as it shows only low degradation rates and leads to degradation products with similar toxicity to Chlordecone itself. The authors of the study indicate that phyto-remediation might be an economically viable option for the decontamination of soil which is polluted with Chlordecone. Chlordecone is taken up by specific plants from the soil. However it is noted that according to the current state of knowledge, phyto-remediation requires large time scales (several centuries) to achieve similar decontamination rates as in solvent extraction (Cabidoche et al., 2006).

## 2.4. Other considerations

### 2.4.1. Access to information and public education

In Canada, the Pest Management Regulatory Agency of Health Canada (PMRA) provides a wide variety of information regarding pesticide regulation through its web site ([www.pmra-arla.gc.ca](http://www.pmra-arla.gc.ca)) including information regarding regulatory decisions taken on pest control products. In taking regulatory decisions on registered products, the PMRA considers the availability of alternatives, and includes relevant information in its documentation. The PMRA website also provides access to a Public Registry that includes a collection of information on pesticides or the pesticide regulatory system, including all publicly available information on currently registered pesticides.

<sup>3</sup> <http://www.chem.unep.ch/saicm/>

<sup>4</sup> Amending Regulation (EC) 850/2004

In the Czech Republic information on Chlordecone is part of the SC/UN ECE CRLTAP education and awareness raising campaign under the national implementation plan.

In Zambia access to environmental information is low, though it has improved in the recent past (ECZ 2001, State of the Environment, Lusaka, Zambia).

Risk Profiles and Risk Management evaluations prepared by the POPRC are made publicly available in six UN languages, which ensure access to basic information on Chlordecone.

#### **2.4.2. Status of control and monitoring capacity**

Information on control and monitoring capacity has been provided by Canada, the Czech Republic and Zambia.. Other Parties and observers did not cover this topic in their responses.

In Canada control and monitoring capacity of pesticide uses is managed by the Pest Management Regulatory Agency (PMRA) through compliance mechanisms in place at border crossings and entry points to prohibit importation of Chlordecone or any other chemicals not registered for use in Canada. Compliance issues within Canada may be referred to the PMRA through the following avenues:

- PMRA compliance activities;
- reporting of suspected infractions; and/or
- results reported from other government agencies.

In Zambia, general chemical control and monitoring capacity is handled through the Environmental Protection and Pollution Control Act which is enforced by the Environmental Council of Zambia (ECZ 2001, State of the Environment, Lusaka, Zambia).

The Czech Republic has reported that there is no specific control and monitoring capacity for Chlordecone.

In general, listing Chlordecone in Annex A will involve control measures that are straight forward to communicate and monitor and therefore should be effective and suitable, even in countries that have limited chemical regulatory infrastructure.

### **3. Synthesis of information**

According to the Risk Profile on Chlordecone the main production of Chlordecone in the USA ceased in 1975 and the use of Chlordecone (or related formulations) may have largely ceased by the end of the eighties. It is assumed that Chlordecone can still be produced or used as an agricultural pesticide in some developing countries, although there are no reports of such production or use. In French overseas territories, Chlordecone was used until September 1993. If it is still used as a pesticide, it will be directly released to the environment. Moreover, due to the high persistency of the substance, contaminated sites can serve as a source of pollution for an extended period.

Chlordecone is already listed in Annex I of the CLRTAP POP Protocol and in the European POP Regulation (EC) No 850/2004. In addition, it is addressed under the OSPAR and HELCOM conventions. At the national level, a legal ban has been reported by Germany, Canada, the USA and Switzerland. In Japan, Chlordecone is included in a list of substances where further information on “environmental risk” is sought.

Chlordecone is an intentionally produced pesticide and thus the most efficient control measure would be the prohibition of all production and uses of Chlordecone and Chlordecone containing products. As no remaining production or uses of Chlordecone have been identified, listing of Chlordecone in Annex A without any specific exemptions would be the primary control measure under the Convention. Listing of Chlordecone in Annex A would also mean that the provisions of Article 3 on export and import and of Article 6 on identification and sound disposal of stockpiles and waste would apply.

As production of Chlordecone has ceased some decades ago in the main producing countries, availability of alternatives, efficacy and cost implications do not constitute a problem. Similarly, significant impact on society is not expected if Chlordecone is listed in Annex A of the Convention. No needs for specific exemptions have been identified.

A beneficial effect could be expected as currently unknown production and use in parts of the world would cease. In addition, management and disposal of any remaining stocks would be further regulated. Finally, re-introduction of Chlordecone which currently remains possible in certain countries and which would directly lead to increased releases and levels in the environment would be prevented on a global scale.

To effectively avoid releases of Chlordecone into the environment however, the issue of environmental degradation of related substances or derivatives (such as Kelevan) into Chlordecone would have to be taken into consideration. Simple

listing of Chlordecone in Annex A of the Convention would not cover this type of release, unless a supplementary provision was added in Annex A Part II.

#### **4. Concluding statement**

The Committee at its second meeting evaluated the risk profile for Chlordecone. While there is a convincing set of data concerning the potential for causing adverse effects, the assessment of the potential for long-range transport is based, due to lack of monitoring data, on physico-chemical properties and modelling data. However, taking into account that a lack of full scientific certainty shall not prevent a proposal from proceeding, the Committee concluded that this chemical is likely, as a result of long-range environmental transport, to lead to significant adverse human health and/or environmental effects such that global action is warranted. The Committee had requested Parties and observers to submit additional information on chlordecone that might be identified during the intersessional period. Despite this call, no new information could be detected by or at the third meeting.

The Committee prepared this risk management evaluation and concluded that although Chlordecone is not known to be currently produced or used, it is important to prevent its re-introduction into commerce and use.

Therefore, in accordance with paragraph 9 of Article 8 of the Convention, the Committee recommends the Conference of the Parties to the Stockholm Convention to consider listing of Chlordecone in Annex A. As no remaining production or uses of Chlordecone have been identified, listing of Chlordecone in Annex A without any specific exemptions is feasible. Furthermore, the Committee recommends focusing the implementation efforts in identifying and managing obsolete stockpiles and wastes containing Chlordecone and setting the proper measures for preventing future production and use of Chlordecone.

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